



## DEPOT: A Database of Environmental Parameters, Organizations, and Tools

### Description

The Database of Environmental Parameters, Organizations, and Tools (DEPOT) has been developed by Sandia National Laboratories as a web-based central warehouse for data essential for environmental risk assessment analyses for the Department of Energy (DOE). Initial efforts have concentrated on groundwater and vadose zone transport data and bioaccumulation factors. DEPOT seeks to provide a source of referenced data that, wherever possible, includes the level of uncertainty associated with these parameters. Depending on the number of data available for a particular parameter, uncertainty is expressed as a standard deviation or a distribution function.

DEPOT also provides DOE site-specific performance assessment data, pathway-specific transport data, toxicity and carcinogenicity data, and links to environmental regulations, disposal site waste acceptance criteria, other environmental parameter databases, and environmental risk assessment models. The web site address is <http://www.prod.sandia.gov/depot>.

### Background

The process of data discovery, validation, and justification is repeated at the program level every time an environmental assessment or environmental impact statement must be conducted. Effort is often duplicated simply because the essential data are not readily available or known to the analyst. Because multiple risk assessment parameter databases already exist, a central data warehouse that links to existing databases and also contains uncertainty-based data is an asset that reduces duplication of data discovery, ameliorates the tedious process of data validation and verification, and promotes greater risk assessment accuracy.



Example of the DEPOT Database



The database currently contains bioaccumulation factor uncertainty data for 29 elements and distribution coefficient data with the associated uncertainty for cesium, strontium, technetium, and uranium. Histograms and probability density functions calculated for the distribution coefficient data are presented graphically.

## Database Structure

The heart of DEPOT is the data contained in the “Chemical Characteristics of Contaminants” section. In addition to the distribution coefficient and bioaccumulation factor data discussed above, this section currently contains general parametric data for 65 chemical compounds (the volatile and semi-volatile organic compounds analyzed in EPA Methods 8260 and 8270), 110 elements, and 267 isotopes. These data are presented in tabular format:

**DEPOT Chemical Compound Data**

Compound	Chemical Formula	Density (g/cc)	Molecular Weight	Diffusion Coefficient in Air	Human Carinogenicity	Human Toxicity	Solubility
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Carcinogenicity and toxicity data are taken from Material Safety Data Sheets for the listed compounds. Clicking on “Solubility,” for example, takes the user to another table, which in this case provides solubilities in water, common acids and bases, and common organic solvents. Other high-level tables provide data on elements and radioactive isotopes. Sub-tables include data on such parameters as distribution coefficient ( $K_d$ ), bioaccumulation factors, transport pathways, and so on.

The database currently has 28  $K_d$  values for cesium, 87 values for strontium, 10 values for technetium, and 18 values for uranium. These data have been used to calculate a mean, standard deviation, histogram, and probability density function (pdf) for each of the four elements.

## Links to Related Sites

DEPOT provides access to other related web sites containing site-specific performance assessment and well monitoring data for Hanford, the Nevada Test Site, Oak Ridge, Savannah River, and the Waste Isolation Pilot Plan (WIPP). Because there are no groundwater pathway contaminant transport data for the Nevada Test Site, only air transport data are available. Clicking on “General Information” takes the user to the web site for that DOE facility, and “Environmental Reports” provides a list of site-specific environmental documents that are web-accessible. This section of DEPOT has been provided as a convenient shortcut for risk analysts who may wish to use site-specific DOE data.

DEPOT also provides links to 14 relevant web sites on environmental regulations; these links will be updated as environmental legislation evolves.

The “Engineered Structures” section of DEPOT will eventually provide links to information on the various types of waste containers, waste barriers, waste forms, waste treatment companies, and waste disposal sites. Links are provided to the Waste Acceptance Criteria of nine DOE and commercial sites. A link has also been provided to the document, “A Comparison and Cross-Reference of Commercial Low-Level Radioactive Waste Acceptance Criteria.”

DEPOT also contains links to web sites dealing with such topics as groundwater contamination and remediation, DOE radioactive waste, EPA risk assessment guidance, geographical information system (GIS) data, exposure factors, and risk assessment tools.

## Conclusion

DEPOT was conceived as a resource for risk assessment analyses that would provide referenced data with a mathematical assessment of data uncertainty. While it has evolved into a comprehensive resource for the entire spectrum of environmental restoration and waste management activities, providing environmental parametric data with an associated uncertainty remains the primary goal. Continued development of the DEPOT web site will provide the risk assessment community with ready access to referenced transport and uptake data collected under a wide variety of conditions. Use of data with an established uncertainty will reduce the need for excessive conservatism in risk analyses, increase confidence that the results realistically portray the projected risks, and result in more efficient use of cleanup resources.

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